



BETTER RESEARCH FOR BETTER BUSINESS

The Expert Panel on Management, Business,
and Finance Research



Council of Canadian Academies
Conseil des académies canadiennes

Science Advice in the Public Interest

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The Council of Canadian Academies

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Library and Archives Canada Cataloguing in Publication

Better research for better business [electronic resource] / Expert Panel on Management, Business and Finance Research.

Includes bibliographical references.

Electronic monograph in PDF format.

Issued also in print format.

ISBN 978-1-926558-18-9

1. Management—Research—Canada. 2. Business—Research—Canada. 3. Finance—Research—Canada. I. Council of Canadian Academies. Expert Panel on Management, Business and Finance Research

HD30.42.C3B48 2009

658.0072*071

C2009-902982-0

Translation:

Translated by Liza Beaulieu, Cr. T., with assistance from Robert Némóz.

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Printed in Ottawa, Canada

September 2009



Council of Canadian Academies
Conseil des académies canadiennes

Canada

This assessment was made possible with
the support of the Government of Canada.

The Council of Canadian Academies

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Acknowledgements

During the course of its deliberations, the panel sought assistance from many people and organizations to provide advice and information for the panel's consideration. Special thanks are due to Red Wilson, Roger Martin, and Paul Bates for their participation as invited speakers at one of the expert panel meetings. The panel also wishes to express their thanks to the 43 researchers, deans, administrators, and private sector representatives who provided valuable insights based on their own expertise and experience via personal interviews. These contributions are acknowledged in further detail in Appendix D (available online at www.scienceadvice.ca). Finally, the panel is greatly appreciative of the response from the academic community for their participation in the online survey. While the survey format does not allow for a direct acknowledgement of the 578 respondents, their involvement provided important information for the panel's deliberations.

Particular thanks is extended to the Canadian Federation for Humanities and Social Sciences, the Canadian Federation of Business School Deans, the Social Sciences and Humanities Research Council of Canada, and the Canadian Chamber of Commerce for their help in disseminating survey invitations and accessing their respective memberships/communities.

The panel would also like to acknowledge the work of several consultants engaged in the process: Science-Metrix for their work on the bibliometric analyses, Ekos for their work on the survey data analyses, and Key Survey for their help in the design and implementation of the online survey.

A handwritten signature in black ink, appearing to read 'David Zussman', is centered on the page. The signature is fluid and cursive, with a long horizontal stroke extending to the right.

David Zussman, Chair
Expert Panel on Management,
Business, and Finance Research

Report Review

This report was reviewed in draft form by the individuals listed below – a group of reviewers selected by the Council of Canadian Academies for their diverse perspectives, areas of expertise, and broad representation from private sector and public sector institutions.

The reviewers assessed the objectivity and quality of the report. Their submissions – which will remain confidential – were considered fully by the panel, and most of their suggestions were incorporated into the report. They were not asked to endorse the conclusions nor did they see the final draft of the report before its release. Responsibility for the final content of this report rests entirely with the authoring panel and the Council.

The Council wishes to thank the following individuals for their review of this report:

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The report review procedure was monitored on behalf of the Council's Board and Scientific Advisory Committee (SAC) by Prof. Margaret Conrad. The role of the report review monitor is to ensure that the panel gives full and fair consideration to the submissions of the report reviewers. The Board of the Council authorizes public release of an expert panel report only after the report review monitor confirms that the Council's report review requirements have been satisfied. The Council thanks Prof. Conrad for her diligent contribution as review monitor.

A handwritten signature in black ink, appearing to read "Peter J. Nicholson", written in a cursive style.

Peter J. Nicholson, President
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Chapter 1 – Introduction

It has long been understood that outstanding leadership can make a significant difference to the performance of societies and economies. Consider Hammurabi's application of the first known written codification of law in ancient Babylon; the establishment of the *Pax Romana* by the Roman emperor Caesar Augustus; Sir John A. Macdonald's promotion of Canada's first transcontinental railway in the 1880s; and Franklin D. Roosevelt's introduction of central economic planning and economic stimulus programs in the United States in the 1930s. These are all examples of the far-reaching impact that leaders can have on the well-being of a society. The exploration of how leadership interconnects with and influences societal, institutional, and organizational performance has been an ongoing subject of study and fascination since ancient times.

In much of the existing research in the fields of management, business, and finance, the concepts of *leadership* and *management* have come to be used interchangeably. Over the last two decades, however, researchers have begun to distinguish between the roles of leaders and managers. The observation that “managers do things right while leaders do the right things” has become a much quoted distinction between the two groups (Bennis & O'Toole, 2005). In his 1990 book, *A Force for Change: How Leadership Differs from Management*, John Kotter argues that good leadership and management are both complementary and essential for success, especially in complex situations and changing environments.

Building both leadership and management capacity in Canadian business is seen as essential to ensuring that the country has the talent to sustain productivity and a high standard of living. In its 2005 report, the Association to Advance Collegiate Schools of Business (AACSB) connects the development of the next generation of business leaders and managers to the creation of new jobs, the generation of broadly distributed wealth, and the education of the population at large (AACSB International, 2005). Similarly, Martin and Milway (2007) argue that a greater commitment to strengthening management talent can play an important part in closing Canada's prosperity gap relative to the United States and other countries and realizing our full economic potential.

These societal benefits rest not only on the development of the talent to lead business enterprises, but also on the advancement of research in business, and hence the development of research leaders. As the research enterprise becomes increasingly complex, its leadership now entails planning and design, the assembly and guidance of the research team, oversight of the conduct of the research, and the dissemination of the results to academics, practitioners, and organizations.

Canada must pursue two complementary leadership development tracks to gain a competitive edge: (i) build the capacity to lead and manage business enterprises; and (ii) build the capacity to lead research and transfer its outcomes to those enterprises.

CHARGE TO THE PANEL

The Government of Canada’s 2007 Budget acknowledged the important role of research in developing business and managerial proficiency, capability, and aptitude by allocating an additional \$11 million per year to the Social Sciences and Humanities Research Council (SSHRC)¹ “targeted to research in management, business, and finance” (Government of Canada, 2007a). In response to this targeted funding allocation, SSHRC has engaged in consultations with the research community, as well as several stakeholder groups, in order to develop a long-term strategy to support research, training, and knowledge mobilization in management, business, and finance (Bastien, 2008). In November 2007, as part of this larger effort, SSHRC asked the Council of Canadian Academies (the Council) to assemble an expert panel to conduct an independent assessment of the strengths and weaknesses of management, business, and finance (MBF) research in Canada. The formal charge to the Council was as follows:

What are the overall, identifiable, strengths and weaknesses of the university-based research community in the areas of management, business, and finance² broadly defined, according to appropriate indicators?³

To assist the panel in its task – and to help identify the specific types of information that would be useful to SSHRC in the development of its long-term strategy – the following sub-questions were also posed:

1. How many Canadian researchers in post-secondary educational institutions, think-tanks, and similar research-oriented organizations are currently focusing their research on management, business, and finance and in what disciplines and departments are they based?

1 In addition to the SSHRC allocation, the 2007 Budget provided \$37 million to the Natural Sciences and Engineering Research Council (NSERC), targeted to research in energy, the environment, and information and communications technologies, and \$37 million to the Canadian Institutes of Health Research (CIHR) for research in the health sciences. The councils are expected to collaborate in managing these targeted resources, combining the strengths of various disciplines in order to achieve the greatest impact (Government of Canada, 2007a). In the 2009 Budget, *Canada’s Economic Action Plan*, the federal government continued to support the development of future business talent in Canada by providing an extra \$17.5 million to SSHRC for funding of business-related graduate degrees (Government of Canada, 2009).

2 Note that “finance” is traditionally seen as a sub-discipline of management and business.

3 The original charge is provided in Appendix A.

2. To what degree do researchers in management, business, and finance collaborate with each other, with researchers in related disciplines (including natural sciences and engineering and bio-medical fields), and with external stakeholders?
3. What is the general international standing of Canadian research conducted in these areas according to established benchmarks?
4. What are the strengths and weaknesses of current management, business, and finance research in the three areas targeted by the S&T Strategy, including research gaps (i.e., energy, environment and natural resources, information and communication technologies, and health)?⁴ How do the mandates of NSERC and CIHR approach multi-disciplinary collaborative research, with respect to management, business, and finance in these targeted areas?
5. Given the relative strengths and weaknesses of the Canadian research community in these areas, what should be the balance between providing direct research support and capacity building through research training?
6. Are there identifiable, outstanding opportunities where targeted support for management, business, and finance research can make a significant impact?

To address these questions, the Council appointed a nine-member expert panel that reflects the academic, geographic, and institutional diversity of the Canadian MBF community. The panel is made up of MBF researchers and administrators, and public- and private-sector representatives.

The panel divided the overall charge, and its composite sub-questions, into two categories: (i) research-oriented questions and (ii) analysis questions. The research questions required a marshalling of the relevant evidence in order to provide an assessment of the current state of affairs (i.e., sub-questions 1 to 4). The analysis questions (i.e., sub-questions 5 and 6 and the primary charge) relied on the panel's examination of the previously compiled evidence in order to identify opportunities for targeted research and training funding. This report, which represents the consensus findings of the expert panel, is structured around the six sub-questions presented above, although not in their original order. The panel's response is organized as follows:

4 The S&T strategy outlines four priorities: environmental science and technologies, natural resources and energy, health and related life sciences and technologies, and information and communications technologies (Government of Canada, 2007b).

- The remainder of this chapter introduces the operating context and framework adopted by the panel when considering what constitutes MBF research and outlines the methodologies used to answer the questions.
- Chapter 2 describes the overall landscape of MBF research in Canada.
- Chapter 3 presents data on research collaboration both within and outside of Canada.
- Chapter 4 looks at the overall standing of Canadian MBF research based on international rankings according to several quantitative indicators.
- Chapter 5 discusses how Canadian MBF research output compares with that originating from other countries, both in general and with respect to the four priorities outlined in the federal government’s science and technology (S&T) strategy.
- Chapter 6 summarizes the panel’s answers to the first four sub-questions and outlines the panel’s responses to the primary charge and to sub-questions 5 and 6 regarding potential opportunities for increasing the impact of Canadian MBF research through targeted support mechanisms.

DEFINING MBF RESEARCH

The panel began by establishing a working definition of the field of management, business, and finance. A separate consideration of the three terms, *management*, *business*, and *finance*, each on its own, does not fully elucidate the boundaries of this field. The panel therefore considered the following:

- traditional views and definitions of each of the three terms
- SSHRC’s MBF-specific goal⁵
- the federal government’s original statement about the targeted funding allocation in Budget 2007.⁶

In light of these considerations, the panel adopted the following as an overall context for defining and assessing MBF research in Canada:

Research within any area of management, business, and finance directed at improving the competitiveness and performance of Canadian business.

5 SSHRC’s goal is “to contribute toward innovative management, entrepreneurship, and sustainable economic development practices in Canada through internationally recognized research and training” (SSHRC, 2007).

6 Budget 2007 stated that the funding was “to encourage the granting councils to adopt a more strategic approach and increasingly support multi-disciplinary collaborative research that will address complex issues and create a real advantage for Canada” (Government of Canada, 2007a).

In establishing this framework for MBF research and addressing its mandate within that context, the panel emphasized three issues. This definition is inclusive in the sense that it takes into account research into *any* area within the broad purview of MBF that affects the competitiveness and performance of Canadian business, including, for example, research into public management or research on regulatory issues that affect business performance and competitiveness, such as health care and taxation. Similarly, this definition includes research originating from fields not traditionally associated with MBF – e.g., sociology, psychology, history, medicine, science, and engineering – provided that the focus of the research aligns with the definition outlined above. Since research plays an integral role in capacity building and training, areas such as pedagogical research and the study of the application of research by business practitioners should also be considered relevant.

The focus of this assessment is on the most effective use of the \$11 million annual incremental targeted funds for MBF research announced in Budget 2007, and not on all MBF research supported by SSHRC. Projects outside the purview of this framework continue to be funded through traditional SSHRC channels. The panel has therefore sought a focused context for MBF research that meets: (i) SSHRC’s mandate to contribute toward innovative management, entrepreneurship, and sustainable economic development; and (ii) the federal government’s desire to encourage research that addresses “complex issues and creates a real advantage for Canada” (Government of Canada, 2007a).

METHODS AND APPROACHES

A number of assessments of MBF research have been conducted in other countries such as Australia and the United Kingdom over the past few years or are currently underway (AACSB International, 2009; Allen Consulting Group, 2003; Australian Government, 2005; Scherer, 2002); in Canada, however, only one assessment of this type exists. In 2002, Erhan Erkut measured the output and impact of Canadian business research from 1990 to 1999 (Erkut, 2002) (see Box 1). Since no more recent analysis has been undertaken, it fell to the panel to ascertain the most effective means of data collection and the evaluative measures that could be employed for the purpose of this assessment.

Box 1 – A Measurement of Canadian Business School Research

In 2002, with business schools facing increasing scrutiny of their performance, Professor Erhan Erkut of the University of Alberta sought to quantify the research output of Canadian business school faculty between 1990 and 1999 by focusing on papers published in peer-reviewed journals. To measure the quality of the research output, his study measured the number of citations each paper received from January 1990 to May 2001 – the higher the number of citations, the greater the *impact* of the paper (Erkut, 2002).

- Sixty business schools or programs were identified with 2,495 full-time research professors.
- Canadian business school researchers produced 4,617 papers, published in 779 journals (1990-99) and received 22,303 citations (1990-2001). 1,338 faculty members (54 per cent) had not published a single paper and 215 more (nine per cent) had published, but did not receive any citations.
- Research output from Canadian business schools peaked in 1996 and then declined 20 per cent by 1999.
- Institutional performances varied widely across Canada, with *star researchers* producing most of the highly-cited research output. Fifty per cent of total citations were attributed to papers published by only 67 authors (less than three per cent of total faculty).
- The top nine Canadian business schools identified were (in order of rank): University of British Columbia, University of Toronto, HEC Montréal, York University, McMaster University, the University of Western Ontario, McGill University, University of Alberta, and Queen's University. These institutions accounted for nearly 70 per cent of all citations.
- A comparison of the research output of Canadian business schools with that of a publicly funded U.S. school ranking within the U.S. top 20 (University of Michigan) showed that no Canadian institution came close to Michigan in any of the metrics employed in the study.
- A similar comparison with a publicly funded U.S. school ranking within the U.S. top 40 (University of Georgia) revealed that Canada's top business program (University of British Columbia) ranked higher and our next eight schools were very comparable with the U.S. school.
- The study revealed that in most institutions, the majority of research output is produced by one or two individuals, indicating an alarming lack of research depth within departments.

Erkut concluded that while Canadian business schools contain many exemplary researchers, the overall results of this study should be very troubling to business school administrators. The recent decline in research production, the relatively unbalanced distribution of citation credits, and the lack of a research institute comparable to a U.S. top 20 school were all cited as indicators that Canada needs to accelerate discussions surrounding the future of Canadian business schools.

Quantitative indicators offer one means of evaluating the academic quality and the impact of publicly funded research. Such indicators include, for example, the number of refereed articles by a specific author, the number of refereed articles weighted by the impact factor of the respective journal, and the total number of citations attributed to a given researcher. A review of the literature on the pros and cons of standard quantitative indicators (REPP, 2005) revealed that these metrics, although useful, do not always provide the most accurate means of assessing research quality. Doyle and Arthurs (1995), for example, examined business school research in the United Kingdom and concluded that the Royal Academy of Engineering's method of review, which employed both quantitative and qualitative indicators in its peer review process, made for a better assessment than those reviewed only with quantitative measures. In light of this finding, together with a desire to reflect its broad definition of the MBF research field, the panel decided to use a combination of qualitative and quantitative methods to assess the quality of MBF research output and its level of impact:

- *Bibliometric Analysis*: an analysis of statistics related to published research from peer-reviewed journals from both Canadian and international perspectives.
- *International Rankings*: an examination of the position of Canadian institutions within international research rankings relative to each other and to international institutions.
- *Opinion Survey*: a self-administered online survey of various stakeholder communities regarding their opinion of the current state of MBF research in Canada.
- *One-on-one Interviews*: experience-based opinions of key stakeholders in relevant areas.

Since the applicability of each of the panel's approaches varies depending on the question of interest, not all methods were applied to all aspects of the charge. The two quantitative methods (bibliometrics and international rankings) served to marshal the existing information on Canadian MBF researchers and research output, which the panel then used to assess, against international benchmarks, the overall level and impact of MBF research generated by Canadian researchers. The two qualitative approaches (survey and interviews) sought out new information that could help provide alternative means of identifying the strengths and weaknesses in MBF fields. Each of these methodologies is discussed in further detail below.

Bibliometric Analysis⁷

The humanities and social sciences are often said to be ill-represented by bibliometrics since much of their research output is produced in the form of books rather than journal articles. However, a recent paper showed that MBF research is one of the social sciences that behaves most like the natural sciences in its research publication trends (Archambault *et al.*, 2006). As such, bibliometrics can be used as a quantitative indicator of MBF research output provided that the limitations and potential biases are borne in mind.

Bibliometrics can uniquely provide a normalized data set against which to judge the relative productivity and impact of researchers in a particular field and cross-nationally. Such analyses can be used to identify the major producers of this type of research output and where they are located, the journals in which they publish, and the types of collaborations within the field (Archambault *et al.*, 2006). It is for these purposes that this report employs bibliometrics. (See Appendix B for a full statement on the methodology.) There are, nevertheless, several limitations of bibliometric analysis:

- Its primary output, which is a count of the number of papers produced by the person or institution in question, does not measure overall quality. This weakness can be ameliorated by using the relative citation index – the frequency of citations relative to the average – to measure the *impact* of the research output on subsequent literature in the field.
- The databases that are currently accessible for this type of analysis do not incorporate non-traditional sources of research output and focus solely on peer-reviewed journal articles. This means that textbooks, chapters, and case studies, for example, are not included in output measurements, and the representation of regional journals, smaller journals, and non-English language journals is minimal (REPP, 2005).

Despite these limitations, bibliometrics can still be useful in fields where a major mechanism for research output is the publication in major, peer-reviewed, English-language journals. Canadian research in MBF conforms reasonably well to these circumstances.

7 Bibliometrics is a set of methods used to study or measure texts and information. These can be used to calculate certain types of research outputs and relate them quantitatively with various entities and constituents – e.g., institutions, countries (King, 1987).

International Rankings

The usefulness and relevance of institutional rankings remain an issue of considerable debate, particularly in the areas of management and business (AACSB International, 2002; Martin, 2008; Stephenson, 2008). Programs offered by business schools are routinely ranked in a multitude of popular publications – e.g., *Financial Times*, *BusinessWeek*, *Forbes*, and *The Economist*. These rankings are often used as indicators of the overall quality of an MBA program offered at a given institution. However, some incorporate a research ranking that can be of use in the context of this assessment, provided one understands the methodologies and the limitations of a given set of rankings.

After considering the various popular ranking entities, the panel selected two international ranking methods based on their assessment of faculty research (and not just training programs), their use of quantitative analyses of peer-reviewed articles, and their overall reputation within the community as appropriate indicators of research standings:

- The Thomson Reuters ranking method looks at both the number of, and citations for, published articles in a series of indexed journals in business and economics and then ranks the top 20 countries according to their overall number of citations.
- The *Financial Times* ranking method calculates institutional rankings according to the number of faculty publications in 40 international academic and practitioner journals.⁸ It then awards points to the business school at which an author is currently employed and weights the total according to faculty size. This ranking system uses only one, or very few, top English-language journals in each MBF sub-field.

Both of these ranking methods have limitations. The *Financial Times* method does not allow for a comprehensive assessment of MBF research conducted outside of business schools, while the Thomson Reuters method looks only at journals indexed under business and economics categories. Neither of the two examines the specific sub-fields of MBF in enough detail to be able to identify particular areas of strength or weakness. (The panel uses alternative methods of evaluation to fill these gaps.) Nevertheless, these rankings provide an independent comparison between the overall research output of Canadian business school faculties and that of their international counterparts.

⁸ The list is put together in consultation with the business schools and is reviewed on a regular basis. It is meant to reflect the highest impact journals such that a threshold standard of quality can be assumed and the ranking can therefore be calculated based solely on the quantity of papers that are published (*Financial Times*, 2009).

Opinion Survey

For the purpose of this report, the panel conducted an online survey of a broad group of stakeholders in late 2008 to solicit opinions on the overall strengths and weaknesses of MBF research in Canada. The target audience included researchers and administrators in the MBF community (both inside and outside of business schools), research-oriented graduate students in the MBF field, senior- and mid-level managers in the private and public sectors, and private-sector *end users* of MBF research (e.g., management consultants, knowledge transfer facilitators, investment bankers, MBF-related publishers). In addition to these targeted individuals, general invitations to participate were sent out to the members of the Canadian Federation for Humanities and Social Sciences, the Canadian Chamber of Commerce, the Canadian Council of Chief Executives, and the Canadian Federation of Business School Deans.⁹

The survey received 578 complete responses. Since the target audience was approached using non-specific invitation methods (e.g., bulk email distribution, website invitations) it is not possible to report an overall response rate for the survey. Of the respondents, 543 listed their professional affiliation as “Faculty Position” (94 per cent of total) and 443 reported that their primary faculty affiliation was with a “Faculty of Management/Business School” (79 per cent of total). The private-sector community constituted less than one per cent of the survey responses. Thus, while a diverse group of stakeholders was invited to participate in the survey, the final responses can only be said to reflect the views of academic MBF researchers in Canada.

A survey of this kind is prone to sample selection bias, which arises from differences between the people who respond and the total target population. Without systematic evidence on the non-respondents, the panel cannot address this issue definitively. Clearly, the opinion data should be placed in the context of the other empirical research conducted on behalf of the panel. Survey respondents should be thought of as stakeholders who feel responsible to express an opinion rather than as a representative sample.

⁹ The survey questionnaire was designed in consultation with panel members and professional survey developers. It was programmed and hosted by Key Survey, a global on-demand web-application company (www.keysurvey.com) specializing in information collection tools that enable organizations to create and distribute surveys and forms online. Invitations to participate in the survey were sent to the above-mentioned groups, who were asked to respond during the period of November 3rd to December 31st, 2008. A web announcement and link was posted on both SSHRC and the Council’s websites for the duration of the survey. See Appendix C for a complete version of the survey questionnaire.

Personal Interviews

In addition to the self-administered online survey, Council staff conducted semi-structured telephone interviews (30 to 60 minutes long) with 43 individuals representing key stakeholder groups identified by the panel. These groups included SSHRC MBF grant recipients, business school or faculty deans or directors, high-ranking executives of corporations, high-level representatives of the financial sector, and members of the management and business consultant community (see Appendix D for a complete list of interviewees). The selection process ensured that a variety of faculties, departments, institution/organization sizes, and geographical locations were canvassed. The goal in selecting the interview respondents was to represent constituencies with small samples of key representatives. The strong convergence in the responses of different members of each of the key informant groups is taken as evidence that the groups have coherent opinions on the questions posed.

Interviewees were asked to respond to a pre-formulated set of questions and were also provided with the freedom to add or elaborate on any other issues they saw as relevant to the assessment at hand. The interviewees were solicited for their opinions on overall strengths and weaknesses, opportunities, relevance and impact of MBF research in Canada and, where applicable, outside of Canada.

Chapter 2 – The MBF Research Landscape in Canada

This chapter describes the Canadian MBF research landscape for the purpose of answering the following sub-question in the charge to the panel: *How many Canadian researchers in post-secondary educational institutions, think tanks, and similar research-oriented organizations are currently focusing their research on management, business, and finance and in what disciplines and departments are they based?*

A comprehensive list of all researchers conducting MBF-related research in Canada is not currently available, and would, in any event, involve some arbitrariness in view of the imprecise boundaries of the field. To develop a reasonable and practical estimate of numbers, the panel looked at: (i) the reported faculty numbers in Canadian business schools; and (ii) the bibliometric analyses of research output, as defined in Chapter 1, by MBF researchers outside of business schools.¹⁰ These indicators consider only *quantitative* metrics for research output in the field. They do not provide insight into the *quality* of this research, which is addressed in subsequent chapters of this report.

DETERMINING THE NUMBER OF MBF RESEARCHERS IN CANADA

As a first step, the panel considered individuals with primary appointments within business schools/faculties. The panel used the membership of the Canadian Federation of Business School Deans (CFBSD) to identify the major programs and faculties across the country. The CFBSD consists of nearly all university-level Canadian schools of business, commerce, and management.¹¹ Fifty-eight

10 The term “think tank” covers a wide range of centres, institutes, forums, and foundations. Many Canadian think tanks focus on policy relating to economic growth and development and do research in the broad area of MBF. (For a directory of Canadian and international think tanks, see <http://www.hillwatch.com>.) Where possible, research output from these sources has been identified. The wide range of think tank and research-oriented institutions, and their diverse operating principles and review policies, makes the identification of MBF researchers located within such organizations difficult and unlikely to reflect an accurate count of all relevant individuals. Since, in many cases, university researchers are responsible for the work carried out in these institutions, the panel felt its examination of the research output by faculty members at post-secondary institutions would reflect much of the work carried out in non-academic settings as well. It should be noted that think tank resources add substantially to the funding committed to MBF research in Canada, but it is difficult to calculate the precise amount. Specific examples of these types of organizations are referenced in later sections of the report.

11 For the sake of inclusivity, this analysis also considers the remaining eight non-member institutions. Colleges offering university programs or credit transfer courses have not been included, as the university side of these institutions is usually very small and their MBF research activity smaller still.

schools/programs were identified¹² with a total of just over 2,900 full-time faculty.¹³ A geographic breakdown reveals that Ontario and Québec lead the rest of the country in MBF academic appointments with 35 per cent and 32 per cent respectively. They are followed by British Columbia (nine per cent) and Alberta (seven per cent), with 17 per cent accounted for by the remaining six provinces.

Table 1
Faculty breakdown by specialty in Canadian business schools

Sub-field of Research	Number of Full-Time Faculty	% of Business School Faculty
Management	491	23
Finance	296	14
Accounting	295	14
Marketing	276	13
Operational Research	206	10
Knowledge and Technology Management	169	8
Economics	139	6
Organizational Studies and Human Resources	113	5
Business	75	3
Other	79	4
Total	2,139	100

All data are from a 2008 survey by the Canadian Federation of Business School Deans. The survey represented approximately 70 per cent of all business schools/faculties in Canada and just over 80 per cent of total faculty (non-reporting schools were generally smaller institutions with small faculty numbers). Categories reported here have been regrouped to align with the nomenclature presented in the bibliometric analyses. Reported faculty numbers represent the self-identified, primary field of research for all full-time faculty.

A recent CFBSD survey of researchers in Canadian business schools and faculties revealed that over 60 per cent are conducting research in the fields of general management, finance, accounting, and marketing (CFBSD, 2009) (see Table 1).¹⁴ Neither this survey, nor the panel's work, accounts for research faculty whose primary

¹² See Appendix E for a full list of the institutions/departments considered in this analysis.

¹³ The panel defined "full-time faculty" as all assistant, associate, or full professors currently located at their parent institutions. Visiting, adjunct, and emeritus professors were not included.

¹⁴ It should be noted that the survey results in Table 1 represent approximately 70 per cent to 80 per cent of total faculty (i.e., 2,139) rather than the 2,900 identified by the panel in its research.

affiliations are in departments outside of business faculties or institutions (e.g., in sociology, psychology, history, or economics departments). In view of the breadth of distribution of these individuals, it was not possible for the panel to identify and count them individually. The next section addresses where these researchers are likely to be found (i.e., in which departments and faculties) and what proportion of the overall MBF research output they appear to generate as determined by bibliometric analysis (see Table 2).

BIBLIOMETRIC ANALYSIS OF MBF RESEARCH OUTPUT

The broadly defined conceptual framework of MBF used in this assessment required the identification of research generated outside of the traditional management and business arenas. To this end, the panel commissioned a bibliographic analysis of research output by Canadians in MBF-related fields from 1996 to 2007. The study was based on a pool of 756 journals globally that are focused on MBF research (see Appendix B for a complete list). To ensure appropriate inclusion of relevant journals, the analysis used a variety of approaches including:

- a search of MBF-related words in journal titles
- the use of the journal classification system developed for the U.S. National Science Foundation
- a comparison against the Scopus and Web of Science classification systems
- the identification of journals that frequently cite previously identified MBF journals or that are highly cited by MBF journals
- an examination of the aims and scope of each of the journals identified above against the panel's working definition of MBF research.

In order to extend the data set and to include research that might not appear in these *traditional* MBF-related journals, the panel asked consultants to carry out an expanded citation analysis which resulted in the inclusion of: (i) papers in which at least 50 per cent of their bibliography referenced papers in the original data set; and (ii) papers that were cited by more than 50 per cent of papers in the original data set. The final data set consisted of a total of 123,810 MBF-relevant papers. Among these were 8,993 (7.3 per cent) where at least one of the authors was located in a Canadian institution. A full methodology is available in Appendix B.

The charge required the panel not only to identify the number of MBF researchers in Canada, but also to determine the disciplines and departments in which they are based. The bibliometric data set provided a distribution of research output by sector, institution, faculty, department, and by area of specialization based on the authors' cited affiliations.

Research Output by Sector, Institution, Faculty, and Department

The bibliometric data revealed the following:

- Ninety-three per cent of the papers identified were produced by university-based researchers (see Figure 1).
- Together, Ontario and Québec¹⁵ produced 68 per cent of the reported output (Figure 2).
- Nearly 50 per cent of the papers were generated by researchers in seven institutions: University of Toronto, HEC/Université de Montréal, University of British Columbia, York University, University of Alberta, University of Western Ontario, and University of Calgary.
- The majority (65 per cent) of the papers originated from within business schools and faculties, although other disciplines and faculties accounted for a significant portion (35 per cent) (see Table 2).

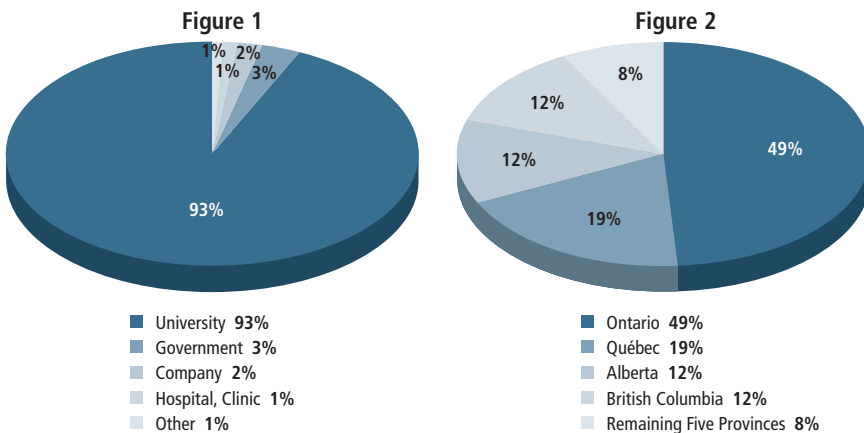


Figure 1

Distribution of MBF research output by sector (determined by bibliometrics)

Sector affiliations are based on authors' primary institutional appointments as listed on published articles. Percentages are calculated from the number of papers published by Canadian researchers with a given institutional affiliation over the total number of Canadian MBF papers in the dataset (i.e., 8,993).

Figure 2

Distribution of MBF research output by province (determined by bibliometrics)

Geographical affiliations are based on the location of authors' primary institutional appointments as listed on published articles. Percentages are calculated from the number of papers published by researchers in a given province over the total number of Canadian MBF papers in the data set (i.e., 8,993).

¹⁵ Researchers in the province of Québec are likely to be somewhat underrepresented in these figures as most research output published in French-language journals is not captured by the Scopus databank.

Table 2**Distribution of MBF research output by department (determined by bibliometrics)**

Sub-field of Research	No. of Papers	% of Total Papers
Management	1,881	21
Organizational Studies and Human Resources	1,024	11
Finance	855	9
Marketing	612	7
Business	547	6
Knowledge and Technology Management	357	4
Healthcare Management	328	4
Public Management	320	4
Information Management	317	3
Accounting	215	2
Operational Research	816	9
Economics	599	7
Psychology	289	3
Engineering	147	2
Computers	140	2
Tourism	121	1
Others	425	5
Total	8,993	100

Disciplinary affiliations are based on authors' primary departmental appointments as listed on published articles. Percentages are calculated from the number of papers published by researchers in a given department over the total number of Canadian MBF papers in the dataset (i.e., 8,993).

As a means of evaluating the breadth of representation by faculty and department within the bibliometric data set, the panel looked at the equivalent distribution for past recipients of SSHRC grants in MBF-related fields. (For complete data and program descriptions, see Appendix F and G.) Given SSHRC's overall mandate, successful applicants were likely to represent a broad sampling of MBF researchers in Canada.

An examination of SSHRC's database for winning research proposals found that while the majority of SSHRC-funded MBF research funds were assigned to researchers working within business schools, a significant portion of researchers from faculties and departments outside of the business schools also received funding.

In the fiscal years 2005 to 2006 through 2007 to 2008, SSHRC's support of management, business, and administrative studies research was \$15.6 million, or 1.7 per cent of total SSHRC research support over that period. This support for MBF research was distributed across eight faculties and 66 departments.¹⁶ Eighty-five per cent of the grants, by numbers (81 per cent by dollars), were awarded to business schools or faculties.¹⁷ Fifteen per cent, by numbers (19 per cent by dollars), were given to non-business faculties including education, engineering, medicine, social sciences, humanities, law, and science (see Table 3).¹⁸ Based on these data, the panel concluded that the bibliometric data set adequately met the desired breadth of representation. A recent review for SSHRC by Public Knowledge Canada, a consultancy firm, provides a quantitative analysis of SSHRC's granting initiatives in management, business, and finance between 1998 and 2007 (see Box 2).

16 SSHRC's search engine categorizes MBF research primarily under two disciplinary categories: "management, business, administrative studies" and "economics". The data presented looked at successful grant applicants from the former category only. Faculty and departmental affiliations are self-identified by the applicant. See Appendix F for a complete tabulation of successful grants and their corresponding faculties/departments.

17 Business faculties include programs offered as distinct management or business concentrations at schools that do not have separate business schools.

18 Funding of MBF research by SSHRC has, in the past, occurred through the traditional programs offered to all SSHRC applicants – e.g., Standard Research Grants, Community-University Research Alliances, Research Development Initiatives, Research Communications Grants, and Strategic Knowledge Clusters. See Appendix G for a complete list of programs with brief descriptions of each.

Table 3

Overall and faculty breakdown of MBF grants administered by SSHRC in fiscal years 2005 to 2008

	Number of Grants	Total Amount Dispersed (\$1000)
Total Grants Administered by SSHRC (2005-08)*	14,075	939,480
<i>of which:</i>		
Management, Business, and Administrative Studies	546	15,574
<i>of which:</i>		
Management, Business, and Administration Faculties	460	12,994
Science Faculties	24	629
Social Science and Humanities Faculties	22	790
Medicine and Applied Health Faculties	12	288
Engineering Faculties	11	379
Science Faculties	11	341
Education Faculties	4	50
Law Faculties	2	103

* Total Grants represents all support allocations made by SSHRC in all disciplines for these funding years. Management, Business, and Administrative Studies is a sub-discipline of the overall pool wherein researchers from any discipline related to these topics can apply for funding. The faculty breakdown in the table represents the number of grants given to principal investigators with primary affiliations either within or outside of business and management faculties yet whose subject matter fell under the management, business, and administrative studies category in SSHRC's award search engine (SSHRC, 2009). The dollar amount corresponds to the total payments over the three years. These numbers do not include those applying under other disciplines such as economics.

Box 2 – An Evaluation of SSHRC-Funded MBF Research

Faced with the task of defining a strategic approach for its future investment in MBF¹⁹ research, SSHRC enlisted Public Knowledge Canada, a consultancy firm, to quantitatively evaluate SSHRC-funded MBF research between 1998 and 2007 (Williams, 2009). The final report, *A Decade of Canadian Research in Management, Business and Finance*, looked at 1,175 SSHRC-funded research projects.

Key Findings

- MBF research in Canada has experienced a decade of growth generated by increasing participation in the Standard Research Grant program and has targeted initiatives on the new economy and in the MBF field itself.
- The field has developed research strength in addressing large socio-economic and cultural activities, notably: financial and monetary systems, employment and labour, innovation, and industrial and technological development.
- The field demonstrates core strength in research on individual and organizational economic activities – marketing, corporate finance, human resources management, governance, strategy, and accounting – with considerable capacity in professional development built through the Initiative on the New Economy program.
- MBF research contributes significantly to our understanding of issues related to consumer behaviour, innovation processes, performance outcomes and measures, competition, and risk and asset pricing, while advancing our understanding of the fundamental contextual changes wrought by globalization and the introduction of new technologies.
- By generating research on the education, technology, financial services, and health sectors, MBF researchers are well-placed to contribute to collaborative projects, engaging scholars in the natural sciences, engineering, and health fields in work on environment and sustainability, health, technology, manufacturing, and natural resources.

The study concludes by acknowledging its own limitations; namely, it does not address the scale and scope of projects funded by others, the full nuance and complexity of the field, or the direction MBF research will take in the future. Williams suggests that such questions should be addressed through national consultations with MBF researchers themselves.

19 For the purpose of this study, MBF relevant research was defined by querying the SSHRC database of funded projects using a list of relevant keywords (i.e., management; business; finance; science & technology; entrepreneurship; competitiveness; industrial/organizational psychology; innovation; commercialization; technology/knowledge transfer; management development; human resources development; business ethics; community economic development; labour markets; environmental management; energy policy and sustainable development; insurance; credit; global value chains; international and domestic markets; services and manufacturing; organizational governance and leadership; business collaboration with artists/designers).

Research Output by Specialization

Of the nearly 9,000 Canadian-authored papers that formed the bibliometric data set, the panel identified 16 sub-fields in which Canadian researchers tended to publish the most (recall Table 2). The distribution across these sub-fields varies among institutions – as measured by the number of papers produced both within and outside of business faculties. In general, *management* represents between 14 per cent and 31 per cent of the total number of papers produced at each school. *Finance* and *organizational studies & human resources* are the next two most prominent sub-fields, accounting for between 10 per cent to 20 per cent of the overall output of most schools. The remaining sub-fields vary substantially from school to school.

Despite the fact that no other sub-fields are represented at all institutions, some notable concentrations exist. For example, *operational research* represents between 14 per cent and 25 per cent of the total number of papers produced by HEC/Université de Montréal, Université Laval, University of Waterloo, and McMaster University, while *marketing* accounts for 14 per cent of Concordia University's output. (See Appendix A for a complete breakdown of research output by sub-field for each of the schools.)

Table 4 shows that, for the most part, the proportion of research output aligns reasonably closely with the number of researchers in that field. But for three groups in particular, the approximate proportionality fails to hold:

- Professors in organizational studies and human resources management produce 11 per cent of the research output, but represent only five per cent of the overall number of researchers.
- Conversely, marketing professors account for 13 per cent of total faculty, but produce only seven per cent of all research output.
- Similarly, accounting professors, who make up 14 per cent the total, are responsible for only two per cent of the research output. While this might be expected of a field more oriented toward practice than research, recent debates suggest a need to look more closely at the apparently limited role of research in this sub-discipline.

Table 4**Top 16 sub-fields of MBF identified by bibliometric analysis**

Sub-field	% of Research Output	% of Total Business School Faculty
Management	21	23
Organizational Studies & Human Resources	11	5
Finance	10	14
Operational Research	9	10
Economics	7	6
Marketing	7	13
Business	6	3
Knowledge and Technology Management	4	8
Healthcare Management	4	n/a
Public Management	4	n/a
Information Management	4	n/a
Accounting	2	14
Psychology	3	n/a
Engineering	2	n/a
Computers	2	n/a
Tourism	1	n/a
Others	3	4
Total	100	100

Percentage of Research Output was calculated based on the relative numbers of papers classified into each sub-field. Percentage of Total Business School Faculty was reproduced based on data from Table 1. Each journal used in the bibliometric analysis was classified into a sub-field manually, based on its title, aims, and scope. Next, the sub-field classification of each journal was tested with citation analysis. Explicit sub-field definitions (Appendix B) were developed based on an analysis of a random sampling of 20 journal article titles in each sub-field. For a more thorough explanation of the sub-field classification process, the final list of journals and their classification, along with the number of papers in each journal, see Appendix B.

Chapter 3 – Collaborative Research Output by Canadian MBF Researchers

This chapter explores the level and types of collaborative efforts within Canadian MBF research in response to the following sub-question in the panel's charge: *To what degree do researchers in management, business, and finance collaborate with each other, with researchers in related disciplines (including natural sciences and engineering and bio-medical fields), and with external stakeholders?*

An assessment of the amount of collaboration in MBF research does not provide any indication as to the type, quality, or impact of this work. While some projects may lend themselves to interdisciplinary approaches, others may be more effectively addressed by an individual researcher. In order to assess the true *value* of collaborative research in MBF fields, one would need to look at numerous individual examples, which is beyond the scope of the panel's assessment. Therefore, this chapter deals primarily with the number of collaborations, rather than with their value.

The panel used its bibliometric data set (as defined in Chapter 2) to identify the number of Canadian collaborative papers published – i.e., multi-authored papers in MBF fields in which at least one author was located in a Canadian institution.²⁰ Of the 8,993 total papers, 4,701 papers, or 52 per cent, were identified as having more than one author. However, papers with more than one author may not always reflect a genuine collaboration. For example, a paper by a principal investigator working with his or her graduate student(s) or co-authors could not be considered *collaborative* work in the sense normally understood. The panel carried out a further refinement of this data set to identify those papers that cited authors from at least two different departments and/or institutions. This yielded 3,568 papers (or 40 per cent of the total number of papers). The subsets discussed in the subsequent sections were obtained from this reduced set of collaborative papers (i.e., the 3,568 papers).²¹

20 It is recognized that an assessment of peer-reviewed, published articles does not represent all types of ongoing collaborative research in Canada. Such an assessment does, however, represent the majority of research output of this kind and, as such, the panel believes that it provides the most representative data on collaborative efforts in the MBF fields. Other sources of collaborative work are presented later in this chapter.

21 For the purpose of subsequent discussions, the working definition used in the bibliometric analysis is “a paper by authors from at least two departments and/or institutions”.

OVERALL COLLABORATIVE TRENDS

Table 5 provides a general overview of the collaborative trends of the top 25 Canadian institutions within the subset discussed in the previous section. It is evident that Canadian MBF researchers are collaborating with their international counterparts, with this type of partnership accounting for 45 per cent of the total collaborative effort. The international collaboration rate exceeded 50 per cent of collaborative papers for 11 of the top 25 universities (with a maximum of 63 per cent at York University and University of Victoria). Only four institutions (University of Ottawa, University of Guelph, University of Saskatchewan, and Dalhousie University) had an international collaboration rate of less than one-third of their total collaborative papers.

At the national level, collaborations are most likely to occur among management departments and faculties (44 per cent of total collaborations) rather than with other disciplines (e.g., engineering, sciences, and medicine). University of New Brunswick had the highest collaboration rate with other departments and disciplines (28 per cent of all collaborations) while University of Saskatchewan appeared to have no interdisciplinary collaborative research at all.

These results should be interpreted with caution, however, when trying to ascertain the level of interdisciplinary research in Canada. Although an article published jointly by a professor of finance and a professor of management would be classified as a publication “within a department of a business school”, this same paper could also be considered interdisciplinary. For example, an article on health management published by a professor in management would be classified as multidisciplinary if one professor is from a medical school while the other is from a business school, but a similar article would be classified as uni-disciplinary if the professor of health management is from a business school and the co-author is a finance professor at the same business school. Thus, this method of categorization does not *fully* reflect the level of interdisciplinary research within a given institution. Nevertheless, it provides a general indicator of collaborative patterns within Canadian institutions.

Table 5**Overall collaborative trends in Canadian MBF research**

Top 25 Institutions (by total number of papers)	Number of Collaborative Papers (% of Total)	Distribution of Collaborative Papers within each Institution (%)		
		International Co-author(s)	Domestic Co-author(s)	
			Within Management Depts.	Outside Management Depts.
University of Toronto	192 (24)	52	35	13
HEC/Université de Montréal	296 (37)	57	36	7
University of British Columbia	159 (29)	46	43	11
York University	137 (26)	63	29	8
University of Alberta	150 (29)	47	42	11
University of Western Ontario	116 (23)	59	34	7
University of Calgary	88 (18)	45	47	8
Concordia University	128 (30)	61	33	6
McMaster University	93 (22)	44	45	11
University of Waterloo	123 (33)	36	42	22
McGill University	109 (30)	48	48	4
Simon Fraser University	81 (25)	45	51	4
Université Laval	128 (42)	50	36	14
Queen's University	123 (46)	50	44	7
Université du Québec à Montréal	145 (58)	50	38	13
Wilfrid Laurier University	118 (51)	51	37	12
University of Ottawa	91 (42)	32	61	7
Carleton University	52 (27)	50	33	18
University of Manitoba	55 (32)	47	43	10
University of Guelph	51 (33)	24	57	19
University of Saskatchewan	35 (23)	17	83	0
University of Victoria	24 (16)	63	30	8
University of Windsor	33 (24)	36	48	16
University of New Brunswick	20 (15)	35	37	28
Dalhousie University	59 (45)	29	62	9
Total and Average Values	2,606	45	44	11

Dataset was for papers published between 1996 and 2007. Collaborative papers are those citing authors from more than one departmental and/or institutional affiliation. The percentage of collaborative papers is compared with the total number of papers (in the complete bibliometric dataset) for a given institution. Collaborations with management departments are the papers where all authors have listed a business school or faculty as their primary professional affiliation. Collaborations outside of management departments are the papers where at least one author has listed a department or faculty outside of a business school or faculty as their primary professional affiliation. Articles published by the top 25 institutions represent 82 per cent of the total university collaborations dataset. It should be noted that universities publishing a significant portion of their research in French-language journals will be under-represented in this analysis.

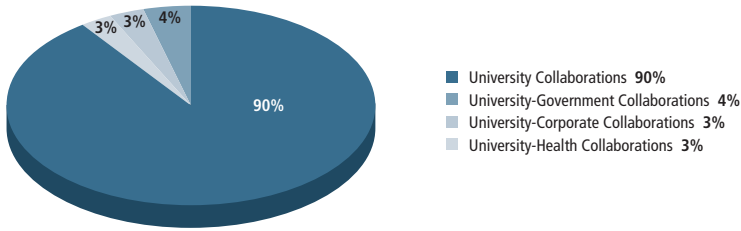


Figure 3

Percentage breakdown of papers by collaboration type

Collaborative papers are those citing more than one author and more than one departmental and/or institutional affiliation. The primary author affiliations cited on each paper were used to categorize the papers by collaboration type.

COLLABORATIONS AMONG UNIVERSITIES

A subset of 3,192 inter-university collaboration papers, or 90 per cent of the collaborative subset (see Figure 3), was obtained using a similar methodology as above. Overall, the data show that approximately one-third of Canadian MBF research output is produced as a result of collaborations between universities and, in most cases, researchers work most frequently with colleagues located within close geographical proximity (see Table 6). The inter-university collaborations of four universities are illustrative:

- At the University of Toronto, 50 per cent of the inter-university collaborative papers are written with Ontario researchers, 15 per cent are written with at least one Québec-based researcher, and 15 per cent with at least one researcher from the Prairies or British Columbia.
- The pattern is almost identical for HEC/Université de Montréal: 53 per cent of the papers are written with other Québec researchers, 16 per cent with Ontario researchers, and seven per cent with researchers from the Prairies or British Columbia.
- At the University of British Columbia, 34 per cent are written with researchers from British Columbia or the Prairies, 34 per cent from Ontario, and three per cent from Québec.
- At the University of Alberta, 33 per cent are written with researchers from the Prairies or British Columbia, 34 per cent from Ontario, and three per cent from Québec.

COLLABORATIONS WITH EXTERNAL STAKEHOLDERS

Further to the collaborations outlined above, universities were also observed to have some, albeit more limited, collaborations with government departments/agencies, healthcare institutions, and corporations. Table 7 shows the most frequent university collaborators for each of these three categories. The nature of this work is discussed in further detail in the following sections.

University-Government Collaborations

Collaborations with government departments or agencies represented only four per cent of total collaborations (papers listing two or more authors, where at least one author is affiliated with a university and one with a government department or agency). An analysis of this data subset revealed that 31 public entities, within all three levels of government (municipal, provincial, and federal), published jointly with Canadian MBF researchers over the period of 1996 to 2007. With the exception of the Government of Alberta's Department of Health, the more frequent collaborators were federal departments and agencies. In some cases, it is easy to see the connection between the collaborators. For example, Natural Resources Canada and the University of Alberta have collaborated on six MBF papers over the past 10 years relating to developments in the Alberta-based energy sector. In other cases, the rationale behind the collaborations is not so clear. The government departments or agencies exhibiting the highest level of collaboration with universities were: the National Research Council (19 papers), Environment Canada (19 papers), the Bank of Canada (14 papers), and Natural Resources Canada (12 papers). Thirty-two universities were identified as co-publishers of the 142 papers. The University of Alberta and the University of British Columbia ranked as the top two schools in output with 15 and 10 papers, respectively.

Table 6

Matrix illustrating the number of inter-university collaborative papers for the top 20 Canadian schools (by number of collaborative papers produced)

Atlantic Provinces												
Dalhousie University	59	3	3	1	3	-	-	-	-	-	-	
Prairie Provinces												
University of Manitoba	55	3	3	2	2	2	-	-	-	-	-	
University of Calgary	88	2	4	5	2	4	-	-	-	-	1	
University of Alberta	150	12	5	4	3	5	4	5	2	-	-	
British Columbia												
Simon Fraser University	81	1	4	8	2	-	5	2	-	-	1	
University of British Columbia	159	11	8	4	6	6	4	3	9	2	-	
Québec												
McGill University	109	4	-	5	4	4	1	1	2	1	-	
Concordia University	128	3	3	1	-	-	9	2	3	2	-	
Université Laval	129	3	2	4	1	1	-	3	4	-	-	
Université du Québec à Montréal	145	-	-	4	-	-	-	2	8	1	-	
HEC/Université de Montréal	296	20	2	2	1	4	6	1	14	5	-	
Ontario												
Ryerson University	58	4	6	2	6	5	1	-	3	-	-	
University of Ottawa	91	2	1	3	1	3	2	5	-	3	-	
McMaster University	93	13	7	3	8	10	4	-	5	-	-	
University of Western Ontario	116	12	6	10	6	5	-	4	2	1	-	
Wilfrid Laurier University	119	11	6	1	31	-	5	10	3	5	-	
University of Waterloo	123	18	5	3	-	31	6	8	1	6	-	
Queen's University	123	13	6	-	3	1	10	3	3	2	-	
York University	137	33	-	6	5	6	6	7	1	6	-	
University of Toronto	192	-	33	13	18	11	12	13	2	4	-	
University	3,192	192	137	123	123	119	116	93	91	58	-	
		University	Ontario	University of Toronto	York University	Queen's University	University of Waterloo	Wilfrid Laurier University	University of Western Ontario	McMaster University	University of Ottawa	Ryerson University

Atlantic Provinces															
Dalhousie University	2	-	1	4	-	9	2	3	1	1					
Prairie Provinces															
University of Manitoba	-	2	1	2	-	7	1	6	4		1				
University of Calgary	-	-	1	1	-	-	-	17		4	1				
University of Alberta	18	3	4	-	2	24	1		17	6	3				
British Columbia															
Simon Fraser University	3	1	-	3	3	23		1	-	1	2				
University of British Columbia	2	-	1	1	2		23	24	-	7	9				
Québec															
McGill University	39	4	4	17		2	3	2	-	1	-				
Concordia University	18	22	3		17	1	3	-	1	2	4				
Université Laval	39	7		3	4	1	-	4	1	1	1				
Université du Québec à Montréal	63		7	22	4	-	1	3	-	2	-				
HEC/Université de Montréal		63	39	18	39	2	3	18	-	-	2				
Ontario															
Ryerson University	5	1	-	2	1	2	1	-	1	-	-				
University of Ottawa	14	8	4	3	2	9	-	2	-	-	-				
McMaster University	1	2	3	2	1	3	2	5	-	-	-				
University of Western Ontario	6	-	-	9	1	4	5	4	7	-	-				
Wilfrid Laurier University	4	-	1	-	4	6	-	5	4	2	-				
University of Waterloo	1	-	1	-	4	6	2	3	2	2	3				
Queen's University	2	4	4	1	5	4	8	4	5	2	1				
York University	2	-	2	3	-	8	4	5	4	3	3				
University of Toronto	20	-	3	3	4	11	1	12	2	3	3				
University	296	145	129	128	109	159	81	150	88	55	59				
	<i>Québec</i>	<i>HEC/Université de Montréal</i>	<i>Université du Québec à Montréal</i>	<i>Université Laval</i>	<i>Concordia University</i>	<i>McGill University</i>	<i>British Columbia</i>	<i>University of British Columbia</i>	<i>Simon Fraser University</i>	<i>Prairie Provinces</i>	<i>University of Alberta</i>	<i>University of Calgary</i>	<i>University of Manitoba</i>	<i>Atlantic Provinces</i>	<i>Dalhousie University</i>

Collaborative papers are those citing more than one author and more than one departmental and/or institutional affiliation. Each institution is granted one collaboration for each time it is listed on a paper. Thus a paper with three authors from different institutions will result in three individual institutions being assigned a collaboration, but is only counted once in terms of collaborative papers. As such, the numbers in a row will not always sum to the total number of collaborative papers.

Table 7**Leading Canadian universities by number of collaborative papers with private and public sector institutions**

	Total # of Papers	Inter-University	Government	Corporate	Health Institutions
Top Inter-University Collaborations					
HEC/Université de Montréal	329	296			
University of Toronto	253	192			
University of British Columbia	200	159			
University of Alberta	175	150			
Université du Québec à Montréal	154	145			
Top Government Collaborations					
University of Alberta	175		15		
University of British Columbia	200		10		
University of Waterloo	136		9		
Université Laval	143		9		
McGill University	128		8		
HEC/Université de Montréal	329		8		
Top Corporate Collaborations					
HEC/Université de Montréal	329			25	
University of British Columbia	200			11	
University of Calgary	114			10	
McMaster University	111			9	
University of Toronto	253			9	
University of Western Ontario	141			7	
Wilfrid Laurier University	134			7	
York University	154			7	
Top Health Institution Collaborations					
University of Toronto	253				36
University of British Columbia	200				16
University of Western Ontario	141				10
McGill University	128				8
Queen's University	136				6

Matrix illustrating the number of collaborations conducted between Canadian universities and other universities, government agencies/departments, corporations, and health institutions.

University-Health Institution Collaborations

Collaborations between health institutions (such as hospitals and clinics) and university-based MBF researchers almost equaled in number those with government (roughly three per cent of the total collaborative papers) and were analyzed separately. The data revealed a strong, and not surprising, collaboration between the University of Toronto and the University Health Network,²² as well as with St. Michael's Hospital. The University of Western Ontario has also established a track record of joint research with the London Health Sciences Centre. Here again, the likelihood of collaboration correlates with geographical proximity.

University-Corporate Collaborations

The collaboration rate between academics and corporations was very low, at three per cent to four per cent of the total. Authors listed 51 companies as their primary affiliation on 121 papers within this data set. These companies spanned a variety of organizations and services including large banks and utility companies, local scientific research companies, medium-sized consulting agencies, international IT providers, and provincial service providers. HEC/Université de Montréal had, by far, the largest number of collaborative papers with corporate entities (25 in total), of which the majority were with Québec corporations (e.g., Bell Canada, HydroQuébec, Caisse de dépôt et placement du Québec). Similarly, both the University of British Columbia (11 papers) and the University of Calgary (10 papers) carried out most of their collaborations with companies in the same province. However, beyond the geography factor noted in the previous cases, it is difficult to identify the motivations behind the reported collaborations. Generally, there is an overall trend of relatively few collaborative research efforts between MBF academics and the private sector, indicating a weak interaction between the producers and the end-users of MBF research in Canada.

OTHER FORMS OF COLLABORATION

Using bibliometrics, the panel was unable to identify *all* forms of collaboration by Canadian researchers in MBF fields. There are a variety of centres in Canada that foster collaborations between MBF researchers and relevant communities. While some of these efforts result in peer-reviewed publications and thus are reflected in the information reported in earlier sections, research resulting from other types of partnerships may instead appear in alternative media (e.g., popular press, colloquia proceedings, and corporate publications). While it is beyond the scope of this assessment to list and evaluate all forms of academic collaborations, the panel wished to highlight two important sources of MBF research:

²² The University Health Network brings together the resources of three hospitals in the Toronto area to provide exemplary patient care, research, and education.

- *Québec Transfer Centres*: In the mid-1980s, the Government of Québec began to support a network of transfer centres that emerged from projects initiated by a group of universities and business people. These five centres are eligible for subsidies, provided all of their projects originate in partnerships with private or public organizations. See Box 3 for summaries of three centres that are relevant to MBF research.
- *Policy Research Institutes*: A number of policy research centres across Canada, with strong mandates to help improve and strengthen public policy decisions, have grown out of specific needs and circumstances with a variety of funding sources. See Box 3 for just two examples of the many centres, institutes, and foundations that generate MBF research.

Box 3 – Examples of Transfer and Policy Centres in Canada

Québec Transfer Centres

CIRANO (Centre for Interuniversity Research and Analysis on Organizations): is an interuniversity centre of research, liaison, and transfer of knowledge focusing on the analysis of organizations. The centre brings together over 100 professors/researchers active in a variety of disciplines (e.g., economics, management, computer science, sociology, law, history, medicine). These researchers belong to eight Québec academic institutions and more than 10 institutions from outside the province in Canada, the United States, and Europe. CIRANO focuses its efforts on public policy, risk, finance, sustainable development, and experimental economics.

CEFRIO (Centre francophone d’informatisation des organisations): concentrates on such subjects as business’ uses of IT, knowledge management, health and IT, and online government. Since its creation in 1987, the Centre has worked on 175 projects, all of which have been placed under the responsibility of university professors. These professors frequently come from Québec’s business schools, but also from European or U.S. institutions.

CRIM (Centre de recherche appliquée en technologie de l’information): establishes links between researchers or users of IT and accelerates transfers to the market. Its membership includes 89 SMEs (small and medium enterprises), 28 large companies, 10 universities, and the MDEIE (Ministère du développement économique, de l’Innovation et de l’Exportation). The centre is currently working on numerous projects, some of which involve information security and audio-video information. While some MBF professors are active within CRIM, many of its researchers come from the engineering field.

Policy Research Institutes

C.D. Howe Institute: Research by the C.D. Howe Institute in Toronto examines economic and social issues affecting the quality of life of Canadians in all regions of the country. The Institute uses expert researchers to generate policy recommendations that are submitted for peer review prior to dissemination. It seeks the engagement of businesses, organized labour associations, professionals, and interested individuals, and disseminates the Institute's work to the general public, the media, academia, experts, and policymakers.

IRPP (Institute for Research on Public Policy): Founded in 1972, the IRPP is an independent, national, nonprofit organization whose mission has been to present new policy ideas and analysis to help Canadians make effective public policy choices based on informed debate. Through its endowment fund, the Institute supports the generation of new research and the connection of this work to decision-makers and the public at large. The Institute's research is meant to highlight priorities in economic and social policies, as well as the relationships between these and broader issues of domestic and international governance.

Note: The information on the transfer centres and research institutes listed above was extracted from the websites of the respective organizations (www.cirano.qc.ca; www.cefrrio.qc.ca; www.crim.ca; www.cdhowe.org; www.irpp.org).

Chapter 4 – Ranking Canadian MBF Research: An International Perspective

An assessment of how Canadian MBF research ranks in comparison with other countries requires more measures than a mere tally of the overall number of published papers; it requires an appraisal of the quality of these papers. While there remains significant debate over the best way to evaluate research *quality*, the use of bibliometric citation-weighted impact analysis is a commonly used and effective tool for evaluating the *impact* of research. To answer the sub-question in the panel's charge – *What is the general international standing of Canadian research conducted in these (MBF) areas according to established benchmarks?* – the panel examined three separate approaches: (i) the Thomson Reuters ranking of countries; (ii) the positions of Canadian institutions in the *Financial Times* ranking; and (iii) a bibliometric analysis of impact from the MBF data set identified in this report. The panel then evaluated these results against the responses to the online survey provided by MBF researchers in Canada.

THOMSON REUTERS RANKING OF COUNTRIES

Thomson Reuters recently published a ranking for all papers published in Thomson Reuters-indexed journals of economics and business for the years 1998 to 2008 (Thomson Reuters, 2009). The results in Table 8 reveal that Canada ranks third both for the number of papers published and the total number of citations, but is eighth in terms of the average number of citations by paper – 5.15 citations per paper for Canada compared with 7.76 citations for the United States. The U.S. clearly dominates the rankings for all three measures. A comparison between Canada and the United Kingdom (second in all three rankings) reveals that Canada has a relatively similar citation index (i.e., the average number of citations per paper), though it produces less than half the number of papers generated by U.K. researchers in these fields. The relative size of national population obviously explains some of the differences in Table 6 – e.g., the ratio of the U.K. population to that of Canada (almost two to one) is reflected in the total number of papers, with the U.K. having just over twice as many as Canada. Canada's publications per capita are also similar to the U.S. ratio – in fact, slightly greater.

Table 8
Ranking by citation of top 20 countries in economics and business
by Thomson Reuters

Thomson Reuters International Rankings by Total Citations				
Rank	Country	Papers	Citations	Citations Index
1	U.S.	66,600	516,584	7.76
2	U.K.	17,743	97,614	5.50
3	Canada	8,081	41,654	5.15
4	Netherlands	5,315	27,757	5.22
5	France	5,277	25,056	4.75
6	Germany	6,875	23,937	3.48
7	Australia	5,919	21,497	3.63
8	China	3,658	17,360	4.75
9	Spain	4,240	14,744	3.48
10	Italy	3,494	14,045	4.02
11	Sweden	2,487	13,707	5.51
12	Belgium	2,156	11,135	5.16
13	Israel	1,795	10,822	6.03
14	Switzerland	1,875	10,577	5.64
15	Scotland	1,858	9,005	4.85
16	Denmark	1,509	7,320	4.85
17	S. Korea	1,807	6,780	3.75
18	Japan	2,625	6,734	2.57
19	Singapore	1,260	5,981	4.75
20	Norway	1,428	5,931	4.15

Countries are ordered by the highest total citations for their papers published in Thomson Reuters-indexed journals of economics & business over the period January 31, 1998 to October 31, 2008. The citation index is the average number of citations per paper (Essential Science Indicators, 2009).

FINANCIAL TIMES RANKING OF INSTITUTIONS

Every year, the *Financial Times* (FT) ranks the top 100 MBA programs worldwide (Financial Times, 2009). The FT bases the rankings on its own set of criteria, including salary increases of graduates, international mobility, faculty education level, and research, to name a few. The FT research ranking (see Appendix I) is calculated according to the number of faculty publications in 40 English-language, international academic and practitioner journals.

From 2002 to 2008, eight Canadian schools appeared at least once on the FT's top 100 list for research (Appendix H). For the past four years, six schools (University of Toronto, University of British Columbia, University of Alberta, University of Western Ontario, York University, and McGill University) have routinely placed in the top 50 and one school (University of Toronto) has ranked in or near the top 20 since 2005. Four U.S. schools have routinely appeared in the top 10: Harvard University, University of Pennsylvania, Stanford University, and University of Chicago. The top two international schools (i.e., outside of the United States) are the London Business School and INSEAD (Fontainebleau, France, and Singapore), both of which have consistently placed in or near the top 10. To date, no Canadian school has ranked in the top 10, though the University of Toronto's Rotman School has ranked among the top 20 twice in the past three years. Since 2002, the Canadian schools in the top 100 have tended to improve or at least maintain their rankings. The FT research ranking is dominated by U.S. schools, which hold 32 of the top 40 positions. Of the eight non-U.S. schools in the top 40 in 2008, half were Canadian.

BIBLIOMETRIC IMPACT ANALYSIS

Bibliometrics uses various indicators to measure the *impact* of research. In this assessment, the panel employed two standard indicators of research impact: (i) the average relative citations (ARC) and (ii) the average relative impact factor (ARIF). The ARC is based on the per paper average of the number of citations counted in the year that a paper was published and for the following two years. The count is expressed relative to the worldwide average number of citations for papers in the same specialty. The ARIF estimates impact slightly differently by focusing on the relative impact on a discipline of the journals in which papers are published. An impact factor is calculated for each journal according to the average number of citations per paper for papers published in that journal relative to the average citations per paper for all papers in a given field. To calculate the ARIF for Canadian MBF publications, all Canadian papers in a category (and over a given time period) were totaled and weighted by the relative impact factors of the journals in which they appeared and then divided by the number of Canadian papers to achieve an average. The analysis for the purpose of this assessment used

a citation window of five years. An ARC value above 1 indicates that a given entity (e.g., a country or school) is cited more frequently than the world average, while a value below 1 signifies the reverse. An ARIF above (or below) 1 indicates that a given entity published more (or less) than the world average in highly-cited journals. While an ARC (or an ARIF) measure does indicate the extent to which a specific paper is being cited, it provides no indication of *who* the readers are or the actual influence that the work may have on their own thinking and/or research. A comparison of the ARC and ARIF values for Canadian MBF research against those of other countries places Canada eighth and tied for fourth overall respectively. By both measures, Canada ranks above the world average (see Figure 4).

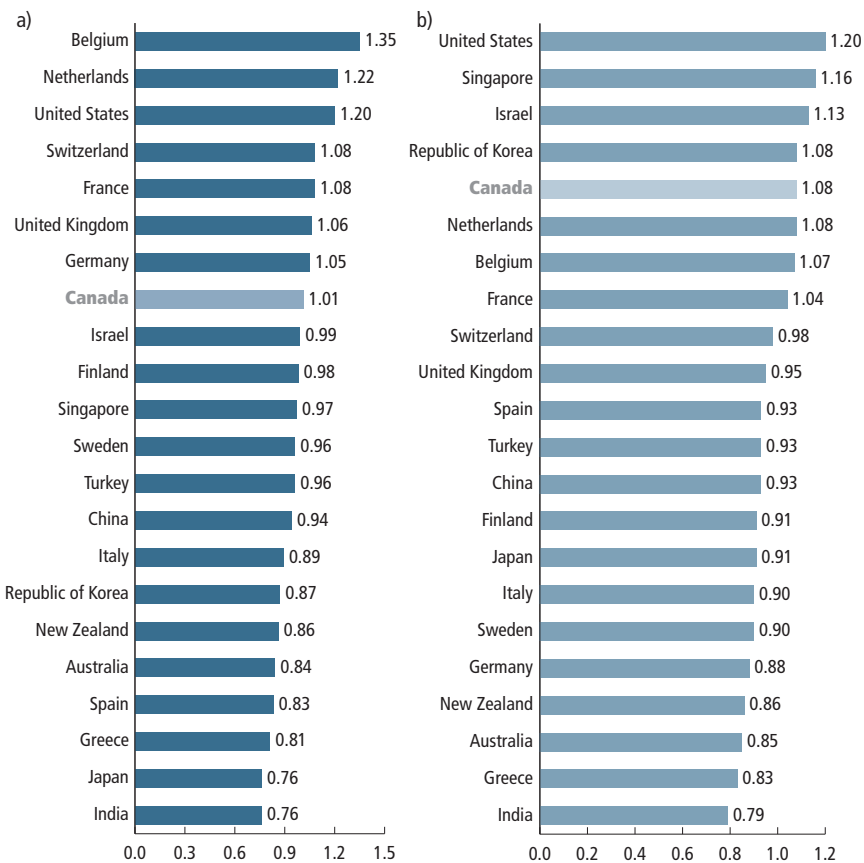


Figure 4

Comparison of the a) ARC and b) ARIF values for MBF research in various countries

Overall rankings of countries by their average relative citation factors (an indicator of research impact based on the average number of citations of each paper counted in the year that the paper was published and for the next two years) and their average relative impact factor (an indicator of the expected scientific impact of papers produced by a given entity based on the citation intensity of the journals in which they were published, calculated over five years).

ONLINE SURVEY FINDINGS

The survey findings highlight the contrast between how Canadian MBF academics perceive the quality of Canadian research as compared with where bibliometric indicators place the research internationally. Survey participants were asked to assess the quality of research being conducted in their area of expertise at all Canadian universities according to five categories: (i) among the best internationally, (ii) good but not among the best, (iii) fairly good, (iv) relatively poor, and (v) no opinion.

Overall, the great majority of respondents ranked the quality of Canadian research in their field as anywhere from “good” to “among the best internationally” (see Figure 5). No significant relationship was found between a faculty member’s area of specialization and his or her response (e.g., finance professors were no more likely to respond that their area of research was among the best internationally than organizational behaviour professors). Similarly, the ratings were unrelated to a respondent’s age, rank, or institution.

“Thinking of research in your area at all Canadian universities and considering the quality of research, Canadian research is...”

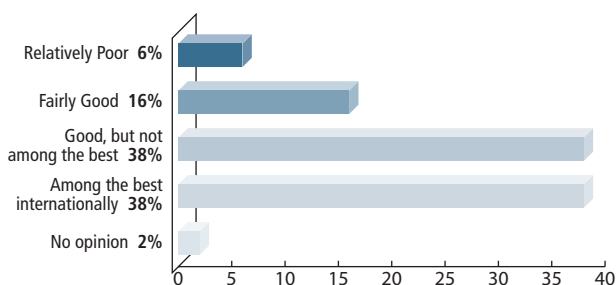


Figure 5

Survey responses (across all fields) assessing the quality of Canadian MBF research in the respondents’ own fields

Survey responses for this question reflect the opinion of 538 respondents. Participants in the survey were over 94 per cent academic, of which 79 per cent listed their primary affiliations as within a business school or faculty.

As indicated in the discussion of methodologies in Chapter 1, the survey respondents represented primarily business school academics. Furthermore, respondents were exclusively based in Canada as survey invitations were not extended to international participants. Thus, the panel would not suggest that the data be taken as a stand-alone indicator. The survey results are nevertheless broadly consistent with Canada's relative international position according to Thomson Reuters, the FT's research ranking, and the two bibliometric rankings.

Chapter 5 – Strengths & Weaknesses of Canadian MBF Research

Having looked at the general landscape of MBF research in Canada and its overall ranking on the international scene, this chapter seeks to identify *specific* areas of strength and weakness in Canadian MBF research in order to answer the following two sub-questions in the charge to the panel:

- *What are the overall, identifiable strengths and weaknesses of the university-based research community in the areas of management, business, and finance broadly defined, according to appropriate indicators?*
- *What are the strengths and weaknesses of current management, business, and finance research in the four areas targeted by the S&T strategy, including research gaps (i.e., Energy, Environment and Natural Resources, Information and Communication Technologies, and Health)?*

The panel used traditional indicators, such as bibliometric rankings by impact factors, as well as results from the opinion survey and stakeholder interviews, to address these questions.

RESEARCH IMPACT IN MBF SUB-FIELDS IDENTIFIED IN BIBLIOMETRICS

The bibliometric analysis of MBF research output identified 16 sub-fields in which Canadian researchers are most likely to publish. Within these, the areas where Canadian MBF research is reported to be above the world average (by ARC) are information management, tourism, healthcare management, computers, general management, and organizational studies and human resources. Although a comparison of the ARC and the ARIF rankings reveals some differences in the specific order of the sub-fields, the top ranking sub-fields remain largely unchanged (see Table 9). One notable exception is healthcare management, which drops from an ARC value of 1.3 to an ARIF of 0.9, suggesting that while the papers are well-cited, they are not being frequently published in prestigious journals. Similarly, Canada's research in public management was rated as having the lowest impact despite the 320 papers published by over 20 institutions.

Table 9
Impact of Canadian MBF research by sub-field rankings

MBF Sub-field	# of Papers	ARC	ARIF	SI
Information Management	317	1.8	2.2	1.2
Computers	140	1.2	1.5	0.9
Organizational Studies & Human Resources	1,024	1.1	1.2	1.7
Management	1,881	1.1	1.2	1.4
Tourism	121	1.5	1.2	1.6
Marketing	612	0.9	1.2	1.3
Finance	855	0.9	1.1	1.2
Business	547	1.0	1.0	1.4
Healthcare Management	328	1.3	0.9	0.9
Operations Research	816	0.8	0.8	1.9
Accounting	215	0.8	0.8	1.2
Knowledge & Technology Management	357	0.9	0.7	1.1
Public Management	320	0.5	0.6	1.3

Listed are the 16 identified sub-fields with their average relative citation factors (ARC – an indicator of research impact based on the average number of citations of each paper counted in the year that the paper was published and for the next two years) and their average relative impact factor (ARIF – an indicator of the expected scientific impact of papers produced by a given entity based on the journals in which they were published calculated over five years). The specialization index (SI) is an indicator of the research intensity for a given entity (e.g., a country) in a specific area of research. Those values falling below world average are shaded.

The panel was also asked to identify strengths, weaknesses, and research gaps in MBF research related to the government's S&T priorities. A complete analysis of the MBF-related research conducted in these areas would require a more focused approach that is specific to these fields. However, to create at least a rough picture, the bibliometric dataset was used to examine the publication trends and impact factors of Canadian MBF research as it relates to the four priorities. Overall, the number of papers produced in each strategic area has increased three to four fold between 1996 and 2007 (see Table 10). Information and communication technologies represented the largest number of papers at 13 per cent of the entire dataset of Canadian MBF articles. This field was followed by health and related life sciences and technologies (seven per cent), environmental science and technologies (six per cent),

and natural resources and energy (five per cent). A comparison of the general output trends against the overall measured impact of the research reveals that with the exception of health and related life sciences and technologies (with an ARIF of 0.9) the ARC and ARIF values for each strategic area lie above the world average.

Table 10

Number of papers published by Canadian MBF researchers in each of the federal government's S&T strategic areas

	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007
Information and communication technologies	59	60	43	56	70	66	83	85	126	154	179	170
	Average ARC = 1.2 Average ARIF = 1.3											
Health and related life sciences and technologies	24	31	38	32	32	49	51	59	64	75	99	88
	Average ARC = 1.2 Average ARIF = 0.9											
Environmental science and technologies	22	23	30	26	20	49	41	56	53	59	65	111
	Average ARC = 1.4 Average ARIF = 1.2											
Natural resources and energy	21	21	30	23	19	31	28	39	35	48	55	80
	Average ARC = 1.2 Average ARIF = 1.2											

Papers in each area were identified by keyword search of the complete dataset identified as Canadian MBF research output (i.e., 8,582 papers). The ARC is the average relative citation factor (an indicator of research impact based on the average number of citations of each paper counted in the year that the paper was published and for the next two years). The ARIF is the average relative impact factor (an indicator of the expected scientific impact of papers produced by a given entity based on the journals in which they were published, calculated over five years).

SURVEY RESULTS

In addition to considering their own specializations, survey respondents were asked to name, unaided, the areas of MBF research in which they believe Canada excels. (Approximately one in four respondents (24 per cent) was unable to provide a response to this question.) Tied at the top of the list were organizational studies & human resources – named by 28 per cent of respondents – and finance (20 per cent), followed by management (16 per cent), business (14 per cent), and marketing (10 per cent). A number of respondents also mentioned corporate governance (seven per cent) as an area of strength in Canadian research (see Figure 6a).

“In what areas of management, business, and finance do you think Canadian research is strongest?”
(unaided responses)



“In what areas of management, business, and finance do you think Canadian research is weakest?”
(unaided responses)

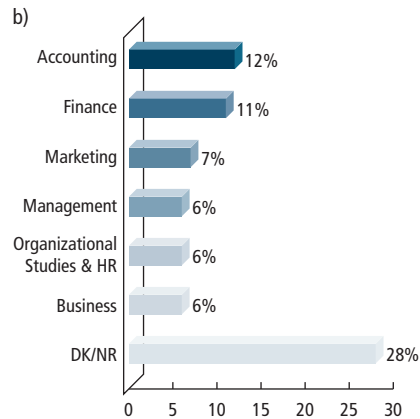


Figure 6

Survey responses regarding areas of MBF research where Canada is a) strongest and b) weakest

Survey responses for these questions reflect the opinion of a) 464 respondents and b) 442 respondents. More than 94 per cent of participants in the survey were from the academic sector, of which 79 per cent listed their primary affiliations as within a business school or faculty. DK/NR = Did not know or no response. (Note: Respondents were able to list both a strength/weakness and a DK/NR.)

Respondents were also asked to name, unaided, the areas where Canadian research is weakest (see Figure 6b). Interestingly, more than one in four respondents (28 per cent) failed to name any area of relative weakness. Topping the list of *weak* areas was accounting (12 per cent), followed closely by finance (11 per cent). Respondents also viewed Canadian research as being relatively weak in: marketing (seven per cent), management, organizational studies & human resources, and business (each

mentioned by six per cent of respondents). There was considerable overlap between the areas of relative weakness and strength (i.e., finance, marketing, management, and organizational studies & human resources appear on both lists), which strongly suggests a lack of consensus among MBF researchers when it comes to assessing Canadian research in these key areas. This result is to be expected, as respondents were likely influenced by their impression of the relative strengths and weaknesses of sub-disciplines in their own schools or in specific specialties within the sub-areas in which they work. A broad range of opinions, with some at both top and bottom, would thus be anticipated. The absence of public administration and healthcare administration in the survey responses indicates that, generally, researchers consider these fields separately from the overall fields of MBF.

“Please rate the quality of Canadian research for each of the following areas (thinking in terms of traditional, university-based disciplines)”:

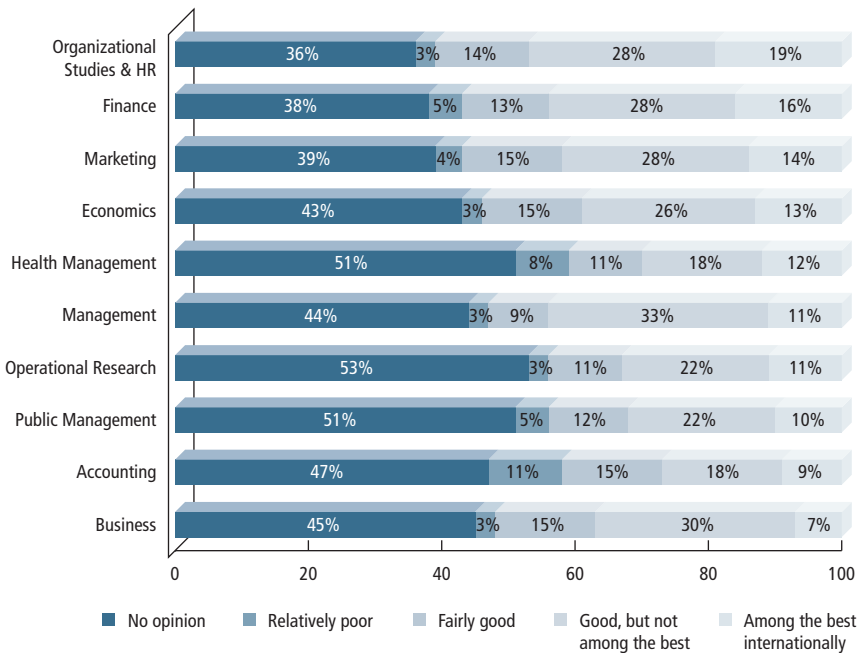


Figure 7
Survey responses rating specific areas of MBF research in Canada

Participants were asked to rank the indicated sub-fields according to one of the five categories specified. Response numbers for this question varied by sub-field. More than 94 per cent of participants in the survey were from the academic sector, of which 79 per cent listed their primary affiliations as within a business school or faculty.

Survey participants were also asked to rate the quality of Canadian research in a number of specified areas (see Figure 7). A significant proportion of respondents did not have an opinion. In fact, a plurality of respondents in every case had no opinion. Moreover, even among the responses of those who expressed an opinion, none of the disciplines stand out as being areas where the quality of Canadian research was deemed as either particularly good or particularly poor. The number of respondents who rated these disciplines as being “among the best internationally” ranged from 7 to 19 per cent.²³ Even fewer, however, provided a rating at the opposite end of the scale (i.e., no more than about one in 10 rated the quality of any of the disciplines as being “relatively poor”). The results in Figure 7 were broadly consistent with the responses of the administrators and researchers who participated in the interviews. When asked to comment on where they felt Canadian MBF research was strongest and weakest, most participants felt that they did not have the knowledge to comment. As one person stated, “. . . it is difficult to discuss areas of strength and weakness as most researchers focus on their areas of expertise. There is no capability to preview all on-going and past MBF research, not only in Canada, but also globally. Even most academic conferences focus on a narrow area of expertise, rarely presenting cross-discipline opportunities for networking and collaboration.”

RESEARCH “RELEVANCE” AS AN INDICATOR

There has been much debate in the literature and popular business press over the issue of research *relevance* versus *rigour* (Buchholz & Rosenthal, 2008; Gulati, 2007; Hatchuel, 2001). Most researchers and administrators agree that the two are not mutually exclusive but rather integral pieces of a larger whole. Both excellence and relevance should be considered jointly. As such, a complete assessment of MBF research requires an evaluation of its relevance both within and outside of the academic community. The previous discussion applied traditional means of bibliometric impact assessments to judge the relevance (as proxied by citation intensity) of Canadian MBF research for other researchers. The following discussion looks at the impact of the scholarship in these fields on the potential end-users of the research.

Apart from direct uptake via published material, there are three likely routes through which knowledge transfer could occur between MBF researchers and practitioners:

²³ The positive ratings are somewhat higher if the percentages are calculated from among those who expressed an opinion (presumably the better informed subset of respondents). For example, among those offering an opinion, 32 per cent ranked Canada’s research in organization studies & human resources to be “among the best internationally”.

- *Transmission of information from recent graduates to their new employers/colleagues.* Students learn new ideas, concepts, and techniques that they take into corporate environments and ultimately contribute to business decisions as these individuals gain experience and expand their influence within the organization.
- *Business consulting firms.* Principles with consulting firms whose consultants may be influenced by academic MBF research in work they undertake for organizations within the public and private sectors.
- *Specialized knowledge centres.* Knowledge transfer institutions, such as Québec's CIRANO, employ top researchers with a common and explicit goal of transforming research results into relevant data for business professionals.

The influence that is transmitted through the first route, the training of new professionals by active and engaged research faculty, tends to occur more slowly and through less direct channels than the other two routes. While this means of knowledge transfer is very difficult to evaluate in terms of immediate and clearly visible returns, it is the panel's view that it remains one of the more important channels and underscores the importance of training graduates in the most up-to-date theories and practices available. To assess the latter two methods and to determine the relevance of MBF research to end-users and stakeholders, the panel conducted a series of interviews with representatives from various groups – e.g., executives, consultants, researchers, and business school administrators – in order to get a sense of the degree to which Canadian MBF research is being used by practitioners in Canada and their views on the relevance of Canadian MBF research outside of academic institutions (see Table 11, and also Appendix D for a full list of participants).

Table 11
Breakdown of interviewees by role

Stakeholder Group	Number of Interviewees
CEO's & CFO's	12
Deans & Directors	11
Researchers	9
Consultants	5
Other	6

The panel identified a number of groups who were most likely to be consumers, directly or indirectly, of MBF research output.

Interviewees were asked to respond to a set of questions (tailored according to their area of expertise) to elicit their insights on: (i) the relevance of Canadian MBF research outside of academic institutions; (ii) the areas of research that hold the most potential for collaboration between business and researchers; (iii) the impediments to knowledge transfer between academics and the private sector; and (iv) the primary challenges facing business in Canada and the role of researchers in helping to overcome them.

Over the course of the 43 interviews, several messages emerged that were consistent across all of the targeted groups. While most participants said that MBF research *should* have a direct application and transfer into the practitioner community, a very limited number indicated that they see evidence of this. With the exception of researchers in Québec, and a handful elsewhere, very little direct collaboration or knowledge transfer is believed to occur between Canadian MBF researchers and practitioners. The interviewees identified several factors as *barriers* to knowledge transfer between the two communities:

Difficulties in Communication. Academic research is seen by the interviewees as largely inaccessible, published in highly-specialized journals in language that is steeped in theory or jargon and is difficult to read.

Absence of Incentives. Academic interviewees stated that they are generally not inclined to conduct research on issues of immediate relevance to businesses because this research is not likely to be published in scholarly journals. Given that refereed publication records and citation indices are often key indicators of performance within universities, which academics must demonstrate in order to achieve career progress goals such as tenure and promotion, there is pressure to produce papers that are likely to be published within the scientific, peer-reviewed literature. This approach inevitably focuses the attention of researchers on the preparation of publications which are theoretical or founded on conceptually-based empirical work rather than work of near-term relevance and applicability to business.

Misaligned Timeframes. Because academic research follows a longer timeframe than actual business projects or problems, research can often take years to reach publication. This delay can render once-valuable research dated and out of touch with the pressing needs of the fast-paced corporate environment. Most critical issues facing businesses tend to be short- to medium-term problems. Academic research, depending on the methodologies employed, may not lend itself to such shorter-term studies and may instead tend to focus on more elucidating, theoretical issues or longer-term empirical questions.

Lack of Accessibility. The lack of opportunities to interact with one another is a sentiment shared by all of the interviewed groups. Academics in particular noted

that there are no obvious channels (except through organizations like CIRANO in Québec) through which they can approach and establish a working relationship with corporate entities.

The fundamental disconnect between researchers and practitioners has resulted in a general lack of both supply and demand between the two communities. Many researchers do not make the effort to reach out to the business community and promote the work that is being done, nor do most practitioners seek out the academics and their research output. This lack of knowledge transfer and communication between university researchers and Canadian business is, of course, not unique to MBF fields. Canadian research and development (R&D) in general is considered to suffer from many of the same problems as those presented here (Brzustowski, 2008).

Of notable exception are Québec's knowledge transfer centres, such as CIRANO (recall Box 3), which employ academics whose primary goal is to provide useful research for various stakeholders. While these centres are an exception to the general rule, they have proven quite successful within the Québec business environment. An evaluation of CIRANO conducted by Québec's Ministère du développement économique, de l'Innovation et de l'Exportation (MDEIE) found that its research activities were diverse, positive, and, most importantly, useful for businesses involved with the centre. Outside of Québec, however, there are no centralized institutions that attempt to bring MBF researchers together with potential users or to facilitate communication and interaction between the communities. Interviewees suggested that while a complete alignment with business needs is not desirable – e.g., business research should not become simply a branch of the consulting industry – there needs to be some consideration of what might prove useful or relevant in the field. Recognizing that the methodologies of MBF researchers do not usually lend themselves to short-term, immediate answers,²⁴ academics need to consider their potential contributions to solving problems in the medium- to long-term in order to have practical applicability.

SURVEY RESPONSES ON THE APPLICATION OF MBF RESEARCH

Overall, participants in the survey agreed that the primary role of university-based researchers in MBF fields is to engage in the same kind of high-quality research that takes place in other fields. However, when asked about the impacts of a more effective, practical application of academic research, respondents overwhelmingly

²⁴ One spectacular exception has been mathematical finance where certain leading-edge techniques were translated quickly and directly into practice. In retrospect, the implosion of the market for exotic financial instruments shows that the translation occurred without an adequate understanding of the risks that the techniques were intended to help manage (Li, 2000; Salmon, 2009).

identified benefits across a number of areas. At least eight in 10 respondents agreed that more effective application of academic research would substantially improve the quality of management (86 per cent), innovation (83 per cent), and productivity (82 per cent) in Canadian business.

Survey results revealed much less agreement about the problems than the perceived impacts (see Figure 8). While a sizable majority agreed that academics fail to communicate their research results to a broader audience (75 per cent), fewer than half (47 per cent) blamed the failure on poor communication skills of the academic community. Most respondents felt that the transmission and application of research findings should have a high priority within academia (74 per cent). Sixty-five per cent of respondents said that improving the link between researchers and practitioners would further MBF research in Canada, although a similar proportion (61 per cent) identified a general lack of interest by the business community as a major problem with the practical application of academic MBF research.

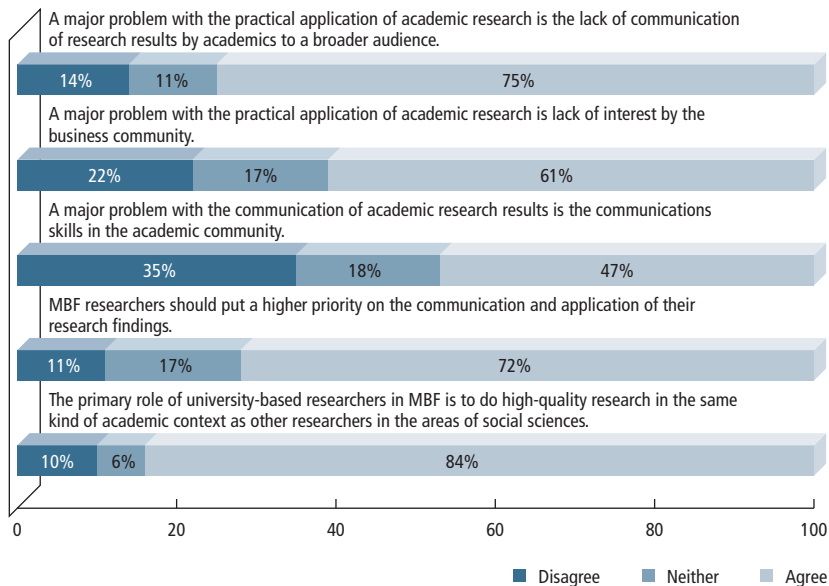


Figure 8

Survey responses to questions regarding the problems associated with practical applications of Canadian academic research

Participants were asked to react to the five statements above according to one of the three categories indicated. Response numbers varied by question. More than 94 per cent of participants in the survey were from the academic sector, of which 79 per cent listed their primary affiliations as within a business school or faculty.

The overall lack of knowledge transfer between Canadian MBF researchers and potential end-users was identified as a significant weakness in Canadian MBF research not only in the interviews but also in the survey. Seventy-four per cent of academics who responded indicated that they thought academics fail to communicate their research results to a broader audience, while 62 per cent felt that there is an overall lack of interest in academic research results within the business community. The perception that there is little collaboration between the two communities is further borne out by the bibliometric data where less than three per cent of collaborative papers originated from university-private sector initiatives.

Chapter 6 – Summary of Findings and Recommendations

The panel has employed several methods to assess the overall state of affairs in Canadian MBF research. Based on the information presented, the following summarizes the response to the first four sub-questions of the charge:

- The Canadian MBF research landscape is composed primarily of researchers in business schools and faculties, although researchers who contribute to MBF fields are found in all university faculties and in a majority of departments.
- More than 40 per cent of the MBF research output from Canadian institutions is collaborative in nature and nearly 45 per cent of that work is produced via international collaborations. Joint publications at the national level occur most frequently between management departments. Collaborative work with the private or public sector represents less than 10 per cent of co-authored papers.
- An evaluation of overall Canadian MBF research output, by various indicators, shows that Canada ranks above the world average. Canada also tends to rank above the world average in most (but not all) traditional MBF disciplines. These data suggest that Canadian MBF researchers are generally well-cited by their peers and, for the most part, publish in well-read, high-quality journals.
- The most significant identified weakness in Canadian MBF research is its lack of explicit relevance and usefulness to potential end-users of the work. There are few contacts between MBF researchers and business people in Canada, other than in Québec. This situation may be symptomatic of a perceived lack of relevance, but the paucity of direct contacts also reduces the likelihood that MBF researchers will be motivated to take up issues of relevance to potential users.

IDENTIFYING OPPORTUNITIES IN CANADIAN MBF RESEARCH

The final sub-question of the charge asked the panel: *Are there identifiable, outstanding opportunities where targeted support for management, business, and finance research can make a significant impact?* The determination of what constitutes an opportunity on which to build or a gap that needs to be filled depends upon the definition one gives to each. An area of strength – e.g., where Canadian researchers are already highly cited – could be seen as an opportunity to excel by investing further resources. Alternatively, such an area could be considered sufficiently well resourced and, as a result, priority for future funding might go towards shoring up areas of comparative weakness. In either case, specific areas of research must be identified and evaluated. Based on the information reviewed, the panel was able to identify research fields where Canada currently has some impact (based on international citation indices), but neither the bibliometric results, nor the opinion-based

approaches, provide evidence that an increased funding allocation in these disciplines – at least in the amount foreseen in Budget 2007 – would result in positioning Canada as a global leader. It is quite possible that targeted investments in specific researchers or research programs could result in a noticeable impact, but it is beyond the purview of this panel to identify such individuals or entities.

The panel, however, was able to identify a significant systemic weakness in Canadian MBF research – namely, its lack of relevance to, and uptake by, the practitioner community. Despite the obvious potential for knowledge transfer and use of MBF research outside of the academic environment, a considerable divide exists between the university research community and the private or public sectors. While this is not unique to MBF, a greater effort needs to be made to ensure both the excellence *and* relevance of Canadian research in these fields. This will take resources and time and, as such, needs to start now.

While not inconsiderable, \$11 million per year is not a large amount of money given the potential demands for support and the scale of overall research funding in Canada. The panel concluded that, if these targeted funds are to make a strategic difference, they should be segregated from the base level of MBF funding and their application should be focused. Based on the evidence provided in this report, and the collective experience and knowledge of the panelists, the panel concluded that the directed application of support toward more relevant MBF research would result in the most significant impact. To this end, the panel proposes the development and implementation of a novel funding program as outlined in the following section.

BETTOR – BUSINESS EXCELLENCE THROUGH TRANSFER OF RESEARCH

SSHRC's stated goal for MBF funding is to contribute toward innovative management, entrepreneurship, and sustainable economic development practices in Canada through internationally recognized research and training. The federal government's stated purpose for the targeted allocation of the \$11 million is to encourage the granting councils to adopt a more strategic approach and increasingly support multi-disciplinary collaborative research that will address complex issues and create a real advantage for Canada.

The Objective

In light of these two aims, the panel proposes a new funding program with the following basic objective:

To encourage research within any area of management, business, and finance directed at improving the competitiveness and performance of Canadian business.

This objective is intended to include *any* research within the broad purview of MBF, including relevant research originating from non-traditional fields – e.g., sociology, psychology, history, medicine, science, and engineering.

To assist in breaking down the academic-practitioner divide, a key component of the supported projects must be a demonstrated potential for knowledge transfer between the research and business communities.

The Approach

The BETToR program would provide funding to support large, multi-year projects.²⁵ This is because MBF research that is most relevant to issues of productivity and competitiveness requires significant, long-term funding commitments that can address large-scale multidisciplinary problems. It is emphasized, moreover, that this program is to support a targeted approach to the allocation of the \$11 million and would not affect the strategy for disbursement of the remaining funds traditionally specified for MBF research. In this way, the proposed BETToR program would provide an opportunity to focus the allocated funds above and beyond the established funding mechanisms and without reducing any of the allocations previously earmarked for other disciplines.

The Mechanism

Proposals would be subject to a two-step adjudication process.²⁶ Step one would involve a peer review to establish the quality of the research proposal, the capacity of the team, and the proposal's consistency with the overall objective of the program defined above. Step two would involve an evaluation by a different jury composed

25 Current initiatives under SSHRC (such as the Strategic Knowledge Clusters, the Community-University Research Alliances, and the Major Collaborative Research Initiatives) do provide larger scale grants that target collaborative and multidisciplinary projects. However, these existing programs do not necessarily align with the objective outlined herein. Furthermore, these often impose minimum and maximum funding limits, team size and composition, direct partnerships, and established academic track records (ruling out junior faculty). See Appendix G for full details on these and other SSHRC programs.

26 Such a process would be roughly analogous to the Canada Foundation for Innovation process of adjudication for the Leading Edge and New Initiative funds (see Appendix I).

of both academics and practitioners. Proposals would then be considered in light of the assessments in the first step but also against a number of further criteria:

- relevance to the overall objective (in particular, to issues of national importance)
- an evaluation of the proposed knowledge transfer mechanisms between the researchers and potential users
- the extent and relevance of collaboration within the research group and with the business community
- the quality and extent of capacity building for junior colleagues and students.

The last criterion is relevant to sub-question 5 in the charge to the panel – i.e., what should the balance be between providing direct research support and capacity building through research training. The panel does not believe that a specific percentage breakdown is feasible since the best allocation will depend on context. It is the panel's opinion that the proposed BET^ToR program would be a particularly effective way to train future professionals in the application of their knowledge and skill set within the workplace. The support of research initiatives focused on improving the competitiveness and performance of Canadian business would contribute to the formation of future professionals who are equipped with the most up-to-date knowledge in areas of relevance to the public and private sectors.

While the program is designed to support major, long-term research undertakings, the panel believes that the qualifying criteria should *not* set explicit dollar thresholds, or place constraints on the composition of the research group – e.g., geographical coverage – nor on any specific set of disciplines that qualify. The large-scale, multidisciplinary problems to be addressed by the program would particularly lend themselves to collaborative participation by researchers supported by NSERC and/or CIHR (see Box 4). To encourage such collaborations, the criteria could add extra “points” for proposals with a tri-council sponsorship. This would also permit the earmarked funding from SSHRC to go further, or the projects to be larger, as a result of the support from the other granting councils. It is therefore a vehicle that could respond to SSHRC's desire to support collaborative research in the theme areas of the S&T strategy – information and communication technologies, health sciences, environment, and energy/natural resources.

To assist SSHRC in the design of the specific parameters of the program, the panel recommends that an advisory group be appointed with broad representation from the research and business communities. Part of the mandate of this advisory group would be to establish the criteria by which the program would be evaluated after five years.

Final Remarks

The bulk of Canadian research funds come from the granting councils and there is little culture of *self-funding* (e.g., endowment building). As a result, the academy is fairly reliant on the funding it receives from the agencies to support and build its research capacity. The federal government's allocation of directed funds (i.e., \$11 million annually, incrementally targeted for MBF research) creates an opportunity for a very strategic use of these financial resources. The panel believes that the adoption of this proposed new funding program will strengthen the most significant identified weakness in Canadian MBF research – i.e., the lack of knowledge transfer between the academic and end-user communities – and, in so doing, achieve the stated objectives of both SSHRC and the federal government.

Box 4 – Inter-Council Multidisciplinary Approaches to MBF Research

In the 2007 Budget allocation, all three of the research granting councils were given funds with the explicit instruction to collaborate in targeting these resources to integrate the strengths of various disciplines and to achieve the greatest impact. Administrators, researchers, and practitioners were all supportive of facilitating these types of partnerships through multi-council funding opportunities.

In the charge to the panel, SSHRC asked: *How do the mandates of NSERC and CIHR approach multi-disciplinary collaborative research, with respect to management, business, and finance in these targeted areas?* In response to this question, the panel reviewed the currently posted mandates, objectives, and strategies of the two partner granting councils (CIHR – the Canadian Institutes Health Research and NSERC – the Natural Sciences and Engineering Research Council) in order to identify what areas of opportunity exist to support multidisciplinary collaborations in MBF-related areas.

Canadian Institutes of Health Research

CIHR's mandate provides CIHR with considerable flexibility in the funding of interdisciplinary and collaborative research endeavours relevant to "health", broadly interpreted. To develop knowledge translation capacity, CIHR is committed to the formation of strategic partnerships, highlighting the private sector (including venture capital firms, manufacturers, and distributors), as a target group for partnership development. One example is their Science to Business (S2B) program, which promotes partnerships between the CIHR and Canadian business schools. S2B aims to develop Canadian capacity in research, technology transfer, venture capital (VC), and business expertise. Further examples of complementary initiatives germane to MBF researchers include the Proof of Principle grants and the Commercialization Management Grants Program.

Natural Sciences and Engineering Research Council

NSERC is the national instrument for making strategic investments in Canada's capability in natural science and engineering. Following the S&T Strategy, NSERC developed programs that allow it to fund projects in which up to 30 per cent of the proposed research can be directed towards SSHRC or CIHR fields, so long as the principal investigator is NSERC-eligible. NSERC has also recently established the CREATE program, which mirrors the Strategic Training Initiative in Health Research (STIHR) program of CIHR. In this program, 80 per cent of the funds must be directed to student scholarships. Only NSERC-eligible principal investigators can apply for the money, but up to 30 per cent of it can be used to fund students in non-NSERC areas. The goal of this program is to promote interdisciplinary collaborations between Canadian researchers, both at the faculty and graduate level.

Note: The information detailed above was extracted from the organizations' respective websites (www.cihr.ca and www.nserc.ca).

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